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Wildfire simulation using LES with synthetic-velocity SGS models J. M. MCDONOUGH[1], TINGTING TANG[2], University of Kentucky — Wildland fires are becoming more prevalent and intense worldwide as climate change leads to warmer, drier conditions; and large-eddy simulation (LES) is receiving increasing attention for fire spread predictions as computing power continues to improve (see, e.g., Coen et al., *J. Appl. Meteor. Climatol.*, 2013; McGrattan, *NIST*, 2008). We report results from wildfire simulations over general terrain employing implicit LES for solution of the incompressible Navier–Stokes (N.–S.) and thermal energy equations with Boussinesq approximation, altered with Darcy, Forchheimer and Brinkman extensions, to represent forested regions as porous media with varying (in both space and time) porosity and permeability. We focus on subgrid-scale (SGS) behaviors computed with a synthetic-velocity model, a discrete dynamical system, based on the poor man's N.–S. equations (Tang et al., *Int. J. Bifur. Chaos*, 2016) and investigate the ability of this model to produce fire whirls (tornadoes of fire) at the (unresolved) SGS level.

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